

EOS Production Sites Network Performance Report: October 2013

This is a monthly summary of EOS network performance testing between production sites -- comparing the measured performance against the requirements. **Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue.**

Highlights:

- **Mostly stable flows**
 - **GPA: 3.79 ↑** (was 3.71 last month).
- **The government was shutdown during the first half of October.** During this period many user flows were discontinued or reduced (Production flows were substantially unchanged). As a result, there was less congestion, and iperf testing results improved during this period.
- **Requirements:** from the Network Requirements Database
- **LaRC ASDC Outflow:** Mostly stable again: congestion only infrequently reducing performance
- **1 flow below Good**
 - LaRC ASDC → JPL: **Adequate**

Ratings Changes:

Upgrade: ↑:

- **GSFC → EROS: Almost Adequate → Good**
(due to lower congestion during the shutdown)

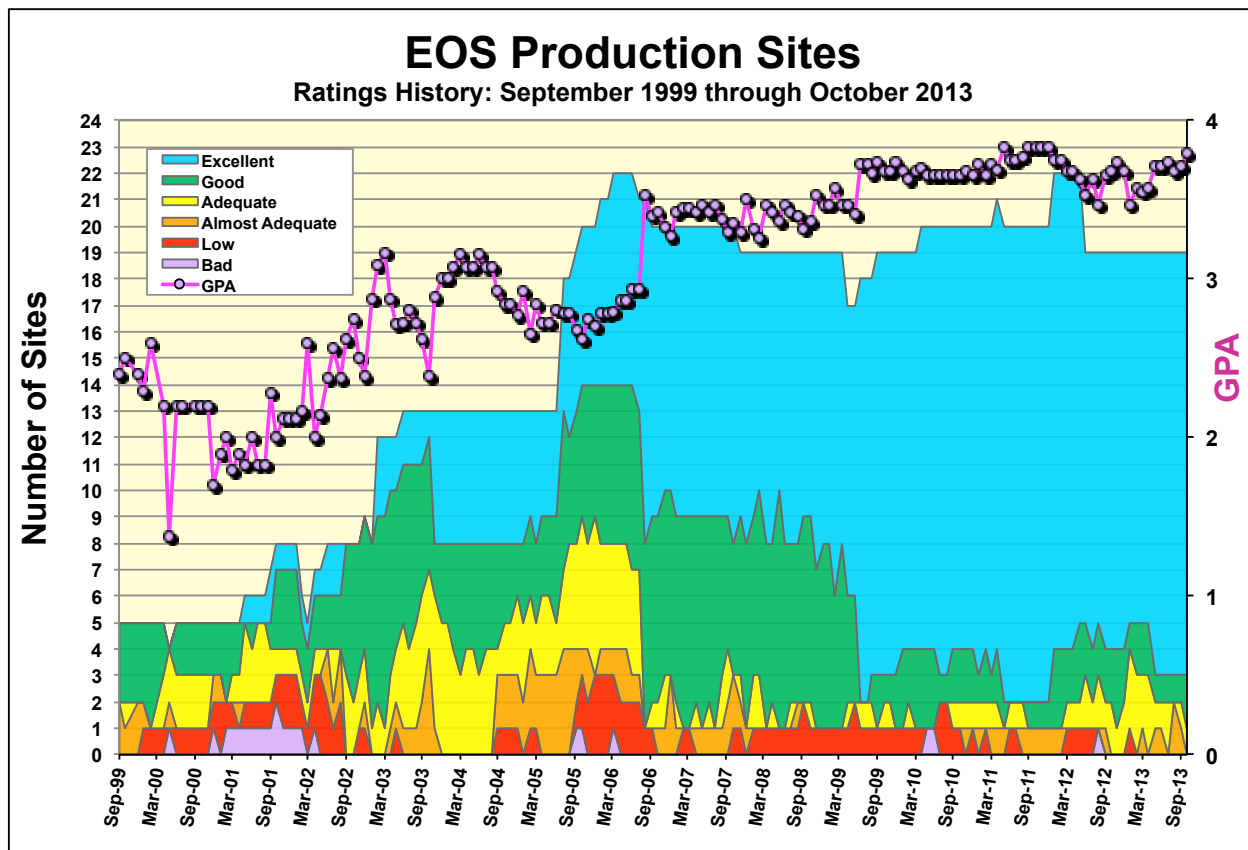
Downgrades: ↓: None

Ratings Categories:

Rating	Value	Criteria
Excellent:	4	Total Kbps > Requirement * 3
Good:	3	1.3 * Requirement <= Total Kbps < Requirement * 3
Adequate:	2	Requirement < Total Kbps < Requirement * 1.3
Almost Adequate:	1.5	Requirement / 1.5 < Total Kbps < Requirement
Low:	1	Requirement / 3 < Total Kbps < Requirement / 1.5
Bad:	0	Total Kbps < Requirement / 3

Where Total Kbps = Average Integrated Kbps (where available), otherwise just iperf

Note that "**Almost Adequate**" implies meeting the requirement excluding the usual 50% contingency factor.

Ratings History:

The chart above shows the number of sites in each rating category since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance – they are relative to the EOS requirements.

Additions and deletions:

- 2011 April: Added RSS to GHRC
- 2011 May: Deleted WSC to ASF for ALOS
- 2012 January: Added NOAA → GSFC-SD3E
Added GSFC-SD3E → Wisconsin
- 2012 June: Deleted GSFC → LASP
Deleted GSFC ← → JAXA

Requirements Basis:

In June 2012, the requirements have been switched, as planned for quite a while, to use the EOSDIS network requirements database. EOSDIS has been reviewing its network ICD's with each of the instrument teams. These ICDs are now essentially completed, and the database has been updated with the ICD values, so those values are now used here.

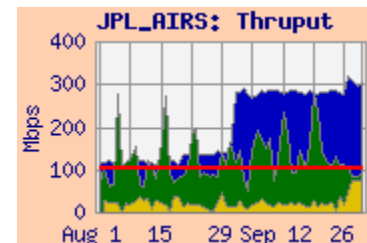
Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that in 1.4.3 most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.

Integrated Charts:

Integrated charts are included with site details, where available. These charts are "Area" charts, with a "salmon" background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (JPL, in this example) obtained from routers via "netflow". The green area is stacked on top of the user flow, and represents the "adjusted" daily average iperf throughput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. Adjustments are made to compensate for various systematic effects, and are best considered as an approximation. The red line is the requirement for the flow from the source to destination facilities. On some charts a blue area is also present – usually "behind" the green area – representing adjusted iperf measurements from a second source node at the same facility.

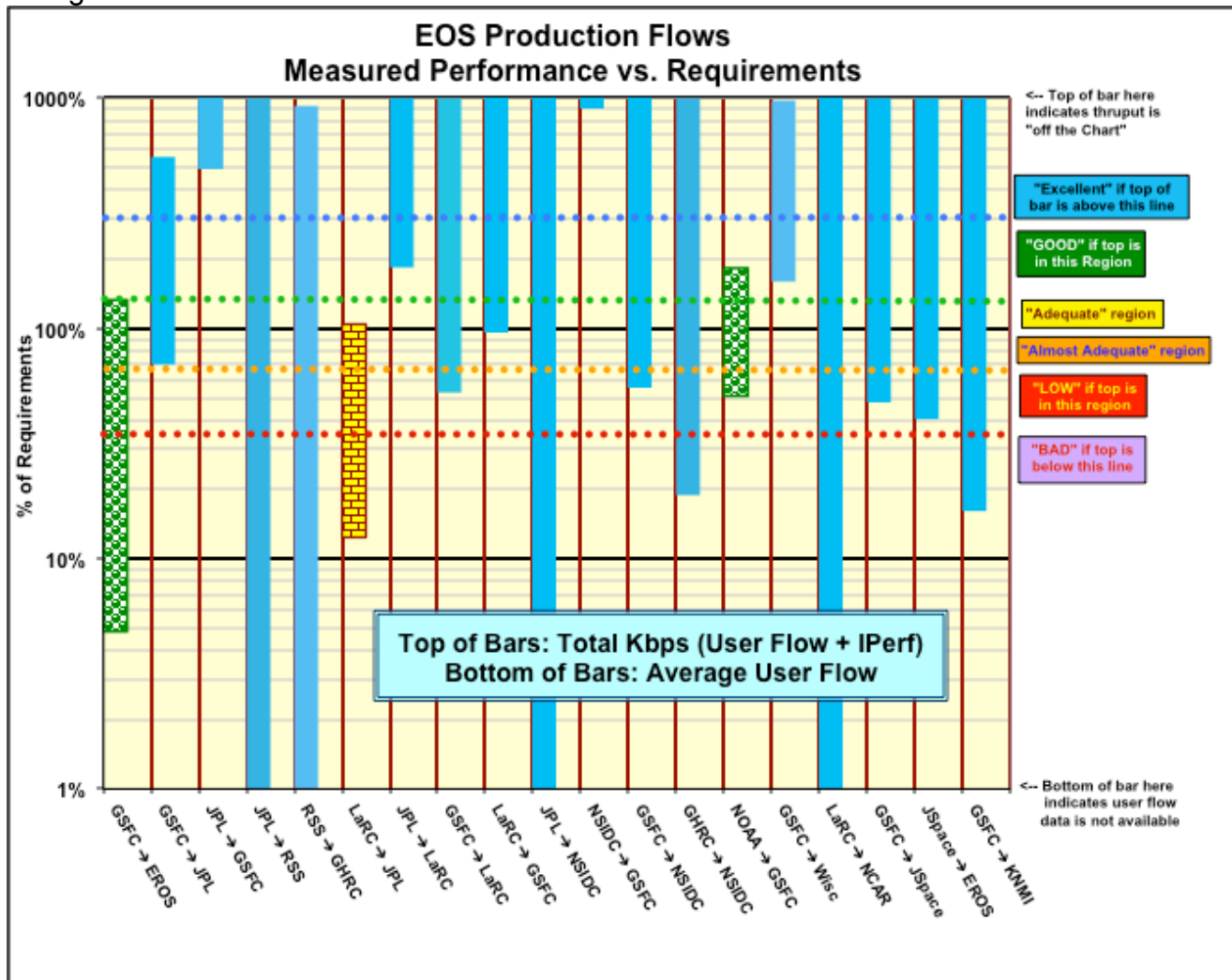


Network Requirements vs. Measured Performance

October 2013		Requirements (mbps)		Testing				Ratings	
Source → Destination	Instrument (s)	Current	Old	Source → Dest Nodes	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re Database Requirements	
		Database	HB 1.4.3+					This Month	Last Month
GSFC → EROS	MODIS, LandSat	548.4	342.9	MODAPS-PDR → EROS LPDAAC	26.5	729.2	729.2	Good	AA
GSFC → JPL	AIRS, MLS, NPP, ISTs	63	116.7	NPP SD3E OPS1 → JPL-AIRS	43.9	350.4		Excellent	Ex
JPL → GSFC	MLS	0.57	0.6	JPL-PODAAC → GSFC GES DISC	2.8	291.3	291.3	Excellent	Ex
JPL → RSS	AMSR-E	0.16	0.5	JPL-PODAAC → RSS (Comcast)		17.6		Excellent	Ex
RSS → GHRC	AMSR-E	0.32	0.34	RSS (Comcast) → GHRC (UAH)		2.95		Excellent	Ex
LaRC → JPL	TES, MISR	83.5	69.3	LARC-ASDC → JPL-TES	10.3	87.2		Adequate	Adq
JPL → LaRC	TES	1.1	1.5	JPL-TES → LARC-PTH	2.02	203.9		Excellent	Ex
GSFC → LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GSFC EDOS → LaRC ASDC	27.5	852.4	852.7	Excellent	Ex
LaRC → GSFC	MISR	0.6	0.4	LARC-ASDC → GES DISC	0.53	924.0	924.0	Excellent	Ex
JPL → NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC → NSIDC		311.9		Excellent	Ex
NSIDC → GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC → GES DISC	2.37	417.5	417.5	Excellent	Ex
GSFC → NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR → NSIDC-DAAC	4.63	568.7	570.2	Excellent	Ex
GHRC → NSIDC	AMSR-E	0.46	0.5	GHRC → NSIDC DAAC	0.09	25.4	25.4	Excellent	Ex
NOAA → GSFC	NPP	522.3	615.6	NOAA-PTH → GSFC NPP-SD3E OPS1	266.0	927.2	954.8	Good	Good
GSFC → Wisc	NPP, MODIS, CERES, AIRS	259.1	253.7	GSFC NPP-SD3E OPS1 → WISC	413.8	2442.8	2533.8	Excellent	Ex
LaRC → NCAR	MOPITT	0.044	0.1	LaRC-PTH → NCAR		159.5		Excellent	Ex
GSFC → JAXA	TRMM, AMSR-E, MODIS	3.51	0.1	GSFC → JAXA	4.40	Testing discontinued: 31 March 2009		n/a	n/a
JAXA → GSFC	AMSR-E	0.16	0.1	JAXA → GSFC	2.47			n/a	n/a
GSFC → JSpace	ASTER	6.75	5.4	GSFC-EDOS → JSpace-ERSD	3.2	111.8	111.8	Excellent	Ex
JSpace → EROS	ASTER	8.3	8.3	JSpace-ERSD → EROS PTH	3.4	178.0	178.0	Excellent	Ex
GSFC → KNMI	OMI	13.4	0.03	GSFC-OMISIPS → KNMI ODPS	2.2	286.1	286.1	Excellent	Ex
		Significant change from HB v1.4.3 to Requirements Database							
		Value used for ratings							
								Ratings Summary	
								Database Req	
								Score	Prev
*Criteria:	Excellent	Total Kbps > Requirement * 3				Excellent		16	16
	Good	1.3 * Requirement <= Total Kbps < Requirement * 3				Good		2	1
	Adequate	Requirement < Total Kbps < Requirement * 1.3				Adequate		1	1
	Almost Adequate	Requirement / 1.5 < Total Kbps < Requirement				Almost Adequate		0	1
	Low	Requirement / 3 < Total Kbps < Requirement / 1.5				Low		0	0
	Bad	Total Kbps < Requirement / 3				Bad		0	0
								Total Sites	19
Notes:	Flow Requirements include: TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP						GPA	3.79	3.71



This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement) – it indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 67% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value is used to determine the ratings.



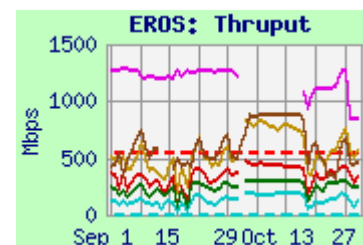
1) EROS:

Ratings: GSFC → EROS: ↑ **Almost Adequate** → **Good**
 ERSDAC → EROS: Continued **Excellent**

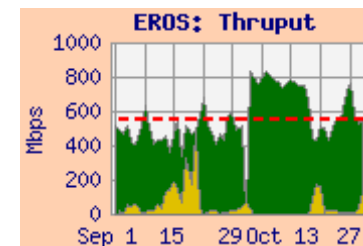
Web Page: <http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml>
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

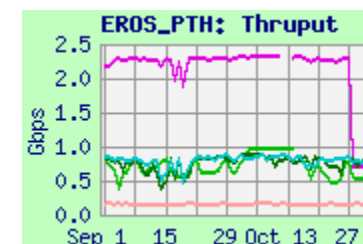
Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → EROS LPDAAC	807.0	729.2	419.1	26.4	729.2
GSFC-EDOS → EROS LPDAAC	300.6	292.5	203.0		
GES DISC → EROS LPDAAC	443.9	420.2	263.1		
GSFC-ENPL → EROS LPDAAC	1133.2	1108.3	937.4		
JSpace-ERSD → EROS LPDAAC	191.5	178.0	104.4	3.37	178.0
NSIDC SIDADS → EROS PTH	808.8	663.9	265.7		
GSFC-ENPL → EROS PTH	2328.3	2295.1	2193.7		
GSFC-ENPL → EROS PTH (IPv6)	864.9	759.5	617.4		
GSFC-NISN → EROS PTH	898.0	818.7	460.5		
ESDIS-PS → EROS PTH	877.5	810.0	341.0		
LaRC PTH → EROS PTH	179.6	160.3	119.5		

**Requirements:**

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	CY '12 -	548.4	343	Good
ERSDAC → EROS	FY '06 -	8.33	8.3	Excellent

**Comments:**

1.1 GSFC → EROS: The rating is based on the **MODAPS-PDR** Server to EROS LP DAAC measurement, since that is the primary flow. The requirement was increased 60% in June '12, switching to the requirements database, based primarily on increased MODIS reprocessing. The average user flow this month is only about 5% of the new requirement (low even with no reprocessing flows). The median integrated throughput from **MODAPS-PDR** to LPDAAC increased substantially, due primarily to reduced congestion during the government shutdown. When the shutdown ended, congestion returned, and throughput dropped back to previous levels. Throughput was now above the requirement, by slightly more than 30%, so the rating improves to **Good**.



Throughput from **GSFC-EDOS** and **GES DISC** (also on EBnet) also increased, and was less noisy. The route from EBnet sources is via the Doors, to the NISN 10 gbps backbone, to the NISN Chicago CIEF, then via GigE, peering at the StarLight Gigapop with the EROS OC-48 tail circuit.

Iperf testing for comparison is performed from **GSFC-ENPL** to both LPDAAC (the "FTL" node, outside the EROS firewall, which was down during the shutdown) and to EROS-PTH (both 10 gig hosts) using both IPv4 and IPv6. The route from **GSFC-ENPL** to EROS is via a direct 10 gig connection to the MAX, to Internet2, to StarLight in Chicago. **GSFC-ENPL** (IPv4) to EROS-PTH now typically gets over 2 gbps. This shows that the capacity of the network is well in excess of the requirement – it would be rated **Excellent**. IPv6 tests appear limited below 1 gbps.

1.2 JSpace-ERSD → EROS: **Excellent**. See section 9 (ERSD) for further discussion.

1.3 NSIDC → EROS-PTH: Performance also improved during the shutdown.

1.4 LaRC → EROS: The throughput from **LaRC-PTH** to EROS-PTH was very stable. The route is via NISN SIP to the Chicago CIEF to StarLight – similar to EBnet sources. Note that **LaRC-PTH** outflow is limited to 200 mbps by NISN at LaRC.

2) to GSFC**2.1) to NPP, GES DISC, etc.**Ratings: NOAA → NPP SD3E: Continued **Good**NSIDC → GES DISC: Continued **Excellent**LDAAC → GES DISC: Continued **Excellent**JPL → GSFC: Continued **Excellent**

Web Pages:

http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml<http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml>http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtmlhttp://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NOAA-PTH → NPP-SD3E-OPS1	937.6	927.2	900.0	266.0	954.8
EROS LPDAAC → GES DISC	897.9	641.5	331.3		
EROS PTH → GSFC-ESDIS PTH	751.7	519.6	97.1		
JPL-PTH → GSFC-ESDIS PTH	92.2	92.2	92.0	2.81	
JPL-TES → GSFC-NISN	538.0	321.3	80.6		
LaRC ASDC → GES DISC	928.9	924.0	629.4	0.53	
LARC-ANGe → GSFC-ESDIS PTH	936.7	932.9	917.0		
NSIDC DAAC → GES DISC	429.4	417.5	369.5	2.37	
NSIDC DAAC → GSFC-ISIPS (scp)	75.3	73.7	56.2		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
NSIDC → GSFC	CY '12 –	0.017	0.6	Excellent
LaRC ASDC → GES DISC	CY '12 –	0.6	0.4	Excellent
JPL → GSFC combined	CY '12 –	0.57	3.2	Excellent
NOAA → NPP SD3E	CY '12 –	522.3	615.6	Good

Comments:

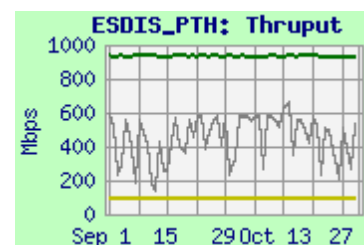
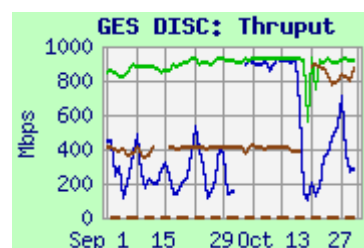
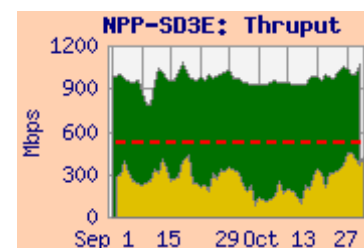
NOAA → NPP-SD3E: Performance from **NOAA-PTH** to GSFC NPP-SD3E-OPS1 was very steady at over 900 mbps, limited by the Gig-E interface on the NOAA side test machine (the circuits are all 10 gbps). User flow was a bit lower than usual, about ¾ of the requirement without contingency.

EROS LPDAAC, EROS-PTH → GSFC: The thrupt for tests from **EROS** to **GES DISC** and from **EROS-PTH** to ESDIS-PTH were less noisy in October – due to the shutdown.

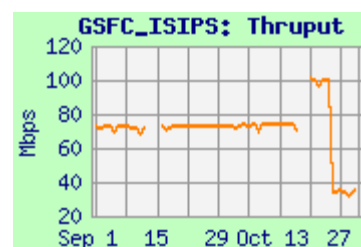
JPL → GSFC: Thrupt from **JPL-PTH** is limited by the Fast-E interface on **JPL-PTH**. With the modest requirement the rating remains **Excellent**. The 2.8 mbps average user flow was close to typical and the old requirement, and well above the new [reduced] requirement. Testing from JPL-TES to GSFC-NISN (not graphed) more clearly shows the capability of the network.

Note that JPL → EBnet flows take Internet2 instead of NISN, based on JPL routing policies.

LaRC → GSFC: Performance from **LaRC ASDC** to GES DISC was not very noisy this month (as it had been previously), due to reduced congestion at ASDC. Thrupt from **LaRC ANGe** to ESDIS-PTH was more stable. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent**. The user flow this month was close to the requirement.



NSIDC → GSFC: Performance from **NSIDC** to GES DISC improved in mid October, due to an upgraded host at NSIDC. It was way above the tiny requirement, so the rating remains **Excellent**. The user flow was again well above both the old and lower new requirement. **Thruput to GSFC-ISIPS using SCP** (iperf testing still down after reconfiguration due to blocking) initially improved with the new host at NSIDC, but then dropped with an ISIPS host upgrade. It remains well above the requirement.

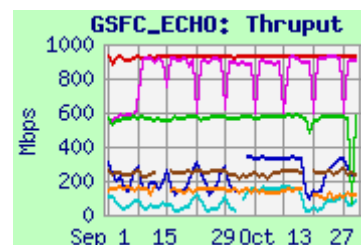


2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfcc/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	342.7	324.2	233.7
EROS LPDAAC ftp	172.0	112.2	50.5
GES DISC	937.7	929.2	912.1
GES DISC ftp	941.2	898.9	509.6
LaRC ASDC DAAC	585.7	575.3	475.3
NSIDC DAAC	265.8	247.8	174.4
NSIDC DAAC ftp	178.6	131.4	66.4



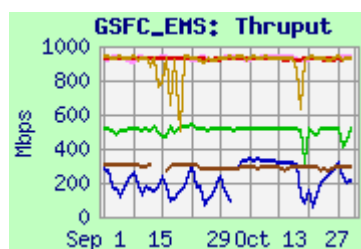
Comments: Performance was mostly stable from all sites. FTP performance is mostly limited by TCP window size – especially from sites with long RTT.

2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfcc/GSFC_EMS.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	331.3	304.2	213.0
ESDIS-PTH	938.2	934.7	620.3
GES DISC	933.3	926.4	572.9
LARC ASDC	523.2	518.2	315.8
MODAPS-PDR	937.8	928.7	602.3
NSIDC-SIDADS	293.2	290.4	247.3



Comments: Testing is performed to GSFC-EMS from the above nodes, iperf only. Performance from **EROS LPDAAC** improved during the shutdown, but resumed its noisy pattern after the shutdown ended. Performance was quite stable from other sources.

3) JPL:

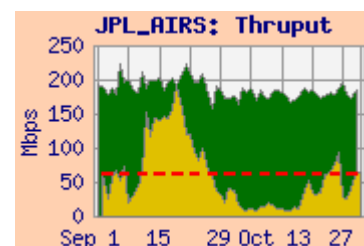
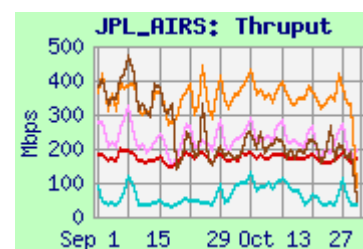
3.1) GSFC → JPL:

Ratings: GSFC → JPL: Continued **Excellent**

Web Pages: http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml
http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml
http://ensight.eos.nasa.gov/Missions/NPP/JPL_SOUNDER.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml
http://ensight.eos.nasa.gov/Organizations/daac/JPL_SMAP.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-GES DISC → JPL-AIRS	209.8	171.0	126.2	43.9	182.3
NPP-SD3E-OPS1 → JPL-AIRS	516.2	350.4	238.3		
ESDIS-PTH → JPL-AIRS	335.8	224.0	127.4		
GSFC-NISN → JPL-AIRS	165.0	77.9	37.4		
NPP IDPS-Mini-inf → JPL-Sounder	130.2	98.8	67.4		
GSFC-NISN → JPL-Sounder	191.9	106.9	54.9		
ESDIS-PTH → JPL-MLS	500.9	416.0	268.9		
GSFC-NISN → JPL-MLS	462.1	309.7	149.4		
ESDIS-PTH → JPL-PODAAC	151.5	120.8	77.2		
GSFC-NISN → JPL-PODAAC	97.5	68.7	42.3		
MODAPS-PDR → JPL-PODAAC	75.7	51.3	32.5		
ESDIS-PS → JPL-QSCAT	92.9	91.6	86.1		
GSFC-NISN → JPL-QSCAT	74.2	70.3	55.5		
GSFC-EDOS → JPL-SMAP	466.2	230.2	99.2		



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	CY '12-	63	116.7	Excellent
GSFC → JPL AIRS	CY '12-	40	98	Excellent
GSFC NPP → JPL Sounder	CY '12-	15	15	Excellent
GSFC → JPL MLS	CY '12-	1.0	2.1	Excellent

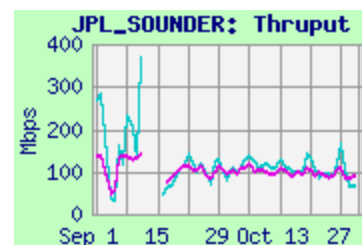
Comments:

AIRS , Overall: The requirements were switched in June '12 to use the requirements database, instead of the Handbook v1.4.3 previously. This resulted in a 46% decrease in the overall requirement.

The AIRS tlc node was moved to a new location in mid-June. When testing resumed about 2 weeks later, throughput was significantly lower from all sources. But the integrated throughput from **NPP-SD3E-OPS1** remained above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent**.

The **JPL overall rating** is also based on the **NPP-SD3E-OPS1** to JPL AIRS throughput, compared with the sum of all the GSFC to JPL requirements. The median throughput remained above 3 x this requirement, so the overall rating remains **Excellent**. Note that the average user flow this month was dropped back below last month's peak, and was close to the requirement (without contingency).

NPP to JPL Sounder: Testing from **NPP IDPS-Mini-inf** to the JPL Sounder PEATE was mostly stable. Performance decreased last month from **GSFC-NISN** – but with less diurnal congestion. The rating remains **Excellent**.



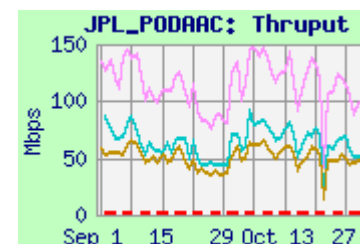
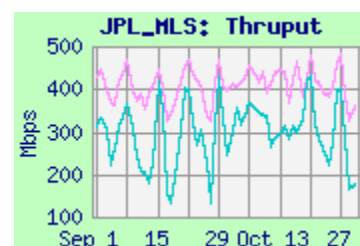
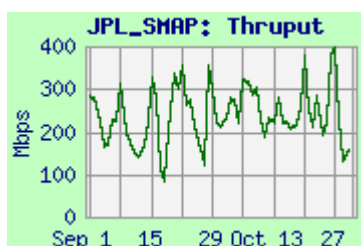
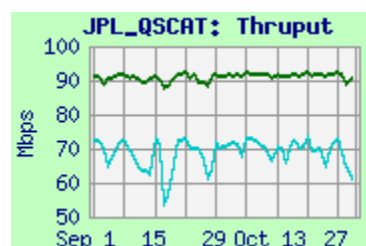
3.1) GSFC → JPL: continued

MLS: Thruput from both **ESDIS-PTH** and **GSFC-NISN** experienced diurnal congestion this month. Both were way above the modest requirement, so the rating remains **Excellent**.

PODAAC: There is no longer a requirement from GSFC to JPL PODAAC in the database. But thuput was way above the previous 1.5 mbps PODAAC requirement. Performance from **GSFC-NISN** increased a bit, after dropping last month.

QSCAT: There is no longer a requirement from GSFC to JPL QSCAT in the database. Thuput from **ESDIS-PS** and **GSFC-NISN** to QSCAT remains well above the modest previous 0.6 mbps requirement. Performance from **GSFC-NISN** was stable.

SMAP: There is no requirement from GSFC to JPL SMAP in the database. Thuput from **EDOS** to SMAP was noisy.

**3.2) JPL → LaRC**

Rating: Continued Excellent

Web Page:

http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

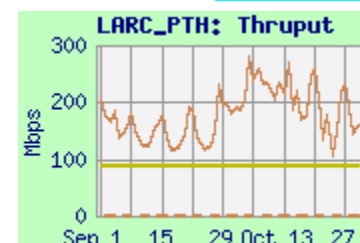
Source → Dest	Medians of daily tests (mbps)			User Flow
	Best	Median	Worst	
JPL-PTH → LaRC PTH	88.9	88.8	88.6	2.02
JPL-TES → LaRC PTH	341.1	203.9	62.5	

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL → LaRC	CY '12 –	1.1	1.5	Excellent

Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. The route from JPL to LaRC is via NISN PIP. This month the thuput from **JPL-TES** was again noisy but remained much higher than the requirement; the rating remains **Excellent**. The user flow this month was almost double the 1.1 mbps requirement but below last month's 3.6 mbps average flow.

Thruput from **JPL-PTH** to LaRC-PTH has been stable at the higher of its two common states (88 mbps) since January 2013, when it switched from the lower of its two common states (60 mbps). It is limited by a Fast-E interface on **JPL-PTH**.



3.3) LaRC → JPL**Rating: Continued Adequate**

Web Pages:

http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtmlhttp://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtmlhttp://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
LaRC ASDC → JPL-MISR	81.3	78.7	46.4	4.1	78.9
LaRC PTH → JPL-MISR	80.2	75.3	53.1		
LaRC ASDC → JPL-TES	98.4	87.2	60.4		
LaRC ANGE → JPL-TES	356.6	282.7	201.3		
LaRC PTH → JPL-TES	176.0	142.3	98.0		
LaRC PTH → JPL-TES sftp	26.6	26.2	10.2	10.3	
LaRC ANGE → JPL-PTH	87.8	86.2	83.1		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
LaRC → JPL-Combined	CY '12 –	83.5	69.3	Adequate
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	Adequate
LaRC ASDC → JPL-TES	CY '12 –	5.5	7.0	Excellent

LaRC → JPL (Overall, TES): Performance from LaRC ASDC to JPL-TES was again mostly stable this month (although substantially below the throughput seen until April 2012). The median throughput increased was similar to last month, and remains above the combined requirements, so the Overall rating remains **Adequate**.

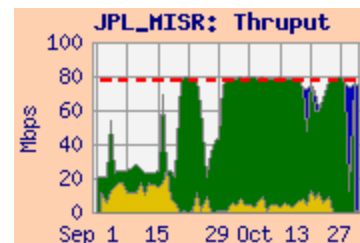
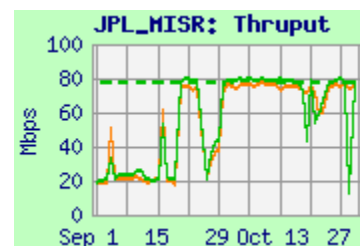
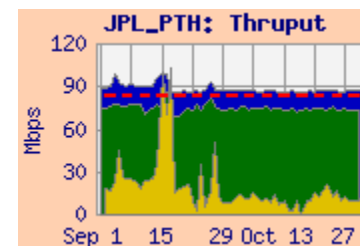
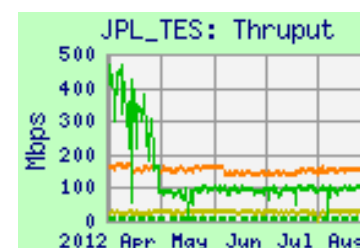
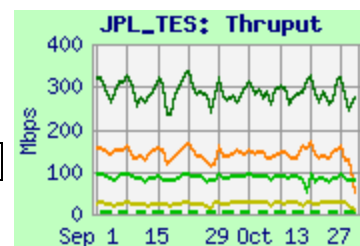
The median throughput remained well over 3 x the TES requirement, so the TES rating remains **Excellent**. User flow to TES is very low.

The JPL-PTH integrated graph shows the overall LaRC to JPL user flow (vs. the overall requirement), which dropped this month after an unusual peak last month.

The true capacity of the network is better seen with the LaRC ANGe → JPL-TES throughput, which is not subject to the ASDC congestion. The Overall rating based on this test would be **Excellent**.

Performance from LaRC PTH to JPL-TES is stable, better than from LaRC ASDC, but is limited to 200 mbps by agreement with CSO / NISN.

LaRC → JPL (MISR): Throughput from LaRC ASDC to JPL MISR is limited by the Fast-E connection to the MISR node. User flow was close to usual this month, and averaged only 5% of the requirement. Throughput to MISR improved back to nominal in late September, after dropping dramatically from all sources in late August. The median integrated throughput increased to slightly above the MISR requirement, so the MISR rating improves to **Adequate**. Since the congestion appears to be local to the JPL-MISR node, the overall LaRC to JPL rating was not reduced based on this problem.



4) GSFC → LaRC:**Rating:** Continued **Excellent**

Web Pages : <http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GES DISC → LaRC ASDC	935.2	934.5	813.4	27.5	934.5
GSFC-EDOS → LaRC ASDC	869.1	852.4	595.2		
ESDIS-PTH → LaRC-ANGe	925.4	912.7	791.2		
GSFC-NISN → LaRC-ANGe	903.0	862.8	660.3		

Requirements:

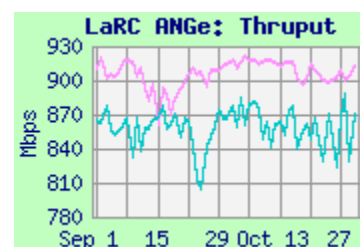
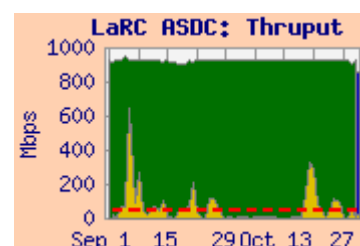
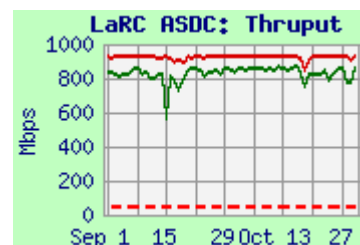
Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	52.2	31.3	Excellent

Comments:

GSFC → LaRC ASDC: Thruput from **GES DISC** to LaRC ASDC DAAC remained well above 3 x the increased combined requirement, so the rating remains **Excellent**. Thruput to ASDC from GSFC-EDOS was a bit noisier but stable.

As seen on the integrated graph, the 27.5 mbps average user flow this month was below both the requirement and last month's flow.

ANGe (LaTIS): Testing to ANGe ("Bob") from both **ESDIS-PTH** and **GSFC-NISN** was very stable, close to the circuit limitation. (Note the expanded scale on the graph).



5) Boulder CO sites:

5.1) NSIDC:

Ratings: GSFC → NSIDC: Continued **Excellent**
 JPL → NSIDC: Continued **Excellent**
 GHRC → NSIDC: Continued **Excellent**

Web Pages: <http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

Test Results: NSIDC S4PA

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → NSIDC DAAC	616.6	568.7	458.9	4.6	570.2
GES-DISC → NSIDC DAAC	504.8	503.9	442.8		
GSFC-EDOS → NSIDC DAAC	160.1	159.2	149.8		
ESDIS-PTH → NSIDC DAAC	604.5	603.6	540.3		
GSFC-ISIPS → NSIDC (iperf)	138.1	135.8	125.3		
JPL PODAAC → NSIDC DAAC	325.1	311.9	238.8		
GHRC → NSIDC DAAC (nuttcp)	92.0	25.4	4.4	0.09	25.4
GHRC → NSIDC DAAC (ftp pull)	68.1	16.2	4.0		

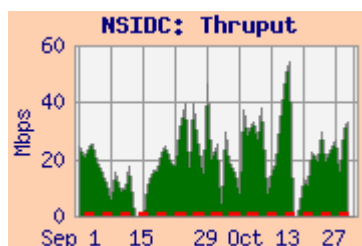
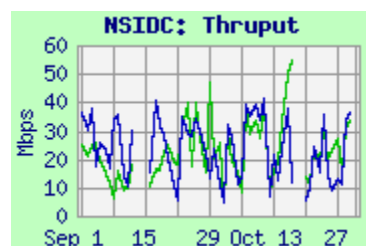
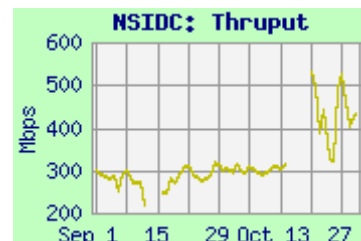
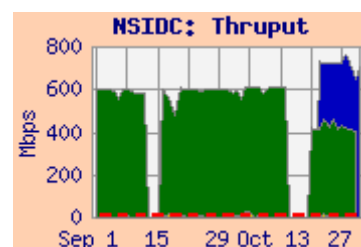
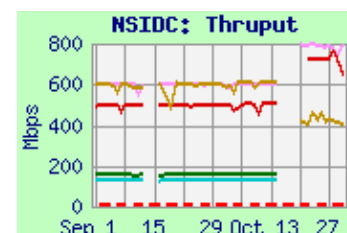
Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	CY '12 –	8.42	27.6	Excellent
JPL → NSIDC	CY '12 –	0.16	0.2	Excellent
GHRC → NSIDC	CY '12 –	0.46	0.5	Excellent

Comments: **GSFC → NSIDC S4PA:** The rating is based on testing from the **MODAPS-PDR** server to the NSIDC DAAC. The requirement was reduced in May '09 from 34.5 mbps (and was 64 mbps in April '08). The NSIDC test host was switched to an upgraded machine on 20 October; performance improved from most sources, but the switch was too late in the month to affect the medians. The integrated thrupt from **MODAPS-PDR** dropped with the node switch (unlike all other sources), but remained well above 3 x the requirement, so the rating remains **Excellent**. The 4.6 mbps average user flow was above the typical flow, but was below the requirement without contingency.

JPL PODAAC → NSIDC S4PA: This requirement was reduced from 1.34 mbps in May '09. Thrupt from **JPL PODAAC** to NSIDC improved in with the NSIDC node upgrade. The rating remains **Excellent**.

GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. The median integrated thrupt was not affected by the NSIDC upgrade, but remained well above 3 x the 0.46 mbps requirement, so the rating remains **Excellent**.

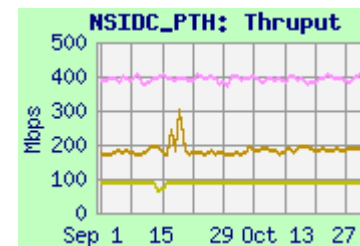
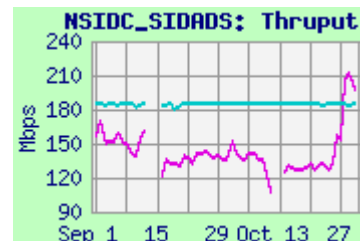


5) Boulder CO sites (Continued):**5.1) NSIDC:** (Continued):**Test Results: NSIDC-SIDADS, NSIDC-PTH**

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	163.4	135.3	105.9
GSFC-NISN → NSIDC-SIDADS	185.2	184.7	160.2
ESDIS-PTH → NSIDC-PTH	444.9	392.8	299.8
MODAPS-PDR → NSIDC-PTH	216.5	183.7	154.6
JPL-PTH → NSIDC-PTH	89.1	89.0	84.6

GSFC → NSIDC-SIDADS: Performance from **GSFC-NISN** to NSIDC-SIDADS was very stable. Performance from **GSFC-ENPL** to NSIDC-SIDADS improved briefly at the end of October, due to changes at **GSFC-ENPL**. Note the expanded scale on the graph.

NSIDC-PTH: Thruput from all sources to NSIDC-PTH was very stable this month. **JPL-PTH** is limited by its Fast-E connection.

**5.2) LASP:**Ratings: LASP → GSFC: Continued **Excellent**

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml>

Test Results:

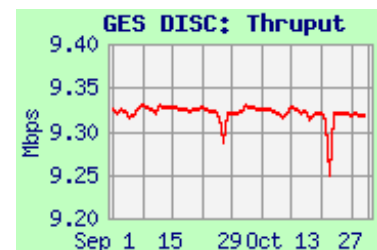
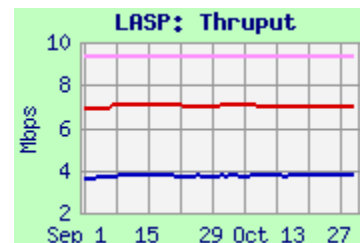
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.79	3.75	3.61
ESDIS-PTH → LASP blue (iperf)	9.38	9.38	8.52
GES DISC → LASP blue (iperf)	7.03	7.03	6.46
LASP → GES DISC	9.32	9.32	9.22

Requirement:

Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	Excellent

Comments: In January '11, LASP's connection to NISN PIP was rerouted: it previously was 100 mbps from CU-ITS via NSIDC; it was changed to a 10 mbps connection to the NISN POP in Denver.

Iperf testing from **GES DISC** has been stable since mid February 2013, when it improved with the GES DISC firewall upgrade. Iperf and SCP testing from **ESDIS-PTH** was also very stable, and consistent with the circuit limitation, as was return testing from **LASP** to GES DISC, rating **Excellent**.



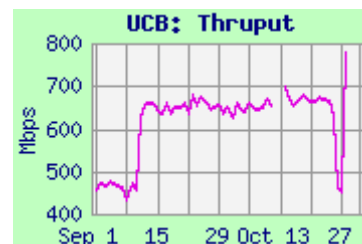
5.3) UCB:

Web Page <http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml>

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL	723.0	660.7	358.9

Comments: Testing to the 10 gig connected test node at UCB began failing consistently in mid-May, so testing was switched to a 1 gig test node in mid-June. The route is via Internet2 to FRGP, similar to NCAR. Thruput dropped with the switch to a new ENPL VM, but recovered with retuning in September. Performance is now mostly stable and consistent with the circuit limitation.



5.4) NCAR:

Ratings: LaRC → NCAR: Continued **Excellent**
 GSFC → NCAR: Continued **Excellent**

Web Pages <http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml>

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
LaRC PTH	181.1	159.5	127.9
GSFC-ENPL-10G	6042.6	4277.4	1643.8
GSFC-ENPL-FE	98.5	97.5	95.9
GSFC-NISN	791.2	537.7	330.5

Requirement:

Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	Excellent
GSFC	CY '12 -	0.111	5.0	Excellent

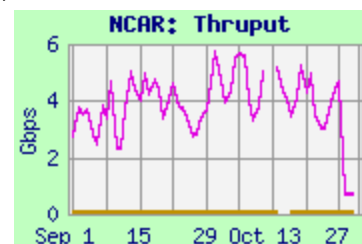
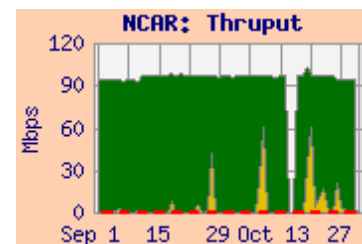
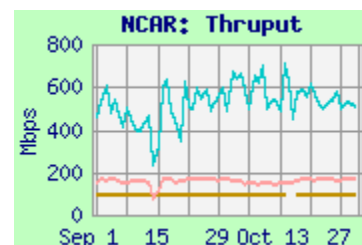
Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Testing was switched to NCAR's 10 gigabit capable PerfSonar server in March '12 – testing was discontinued from LaRC ASDC at that time; testing from LaRC-PTH continued.

From LaRC: Thruput from LaRC-PTH was well above 3 x the modest requirement, so the rating remains **Excellent**. Note that outflow from LaRC-PTH is limited to 200 mbps by NISN.

From GSFC: From GSFC-NISN, the route is via NISN to the MAX (similar route as from LaRC-PTH). Thruput remained somewhat noisy this month, but mostly stable, and well above 3 x the requirement, so the rating remains **Excellent**. The average user flow from GSFC this month was 8.8 mbps, above both last month's flow, and the revised requirement (including contingency).

From GSFC-ENPL-10G, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node is noisy, and gets over 5 gbps on peaks.



6) Remote Sensing Systems (RSS):

Ratings: JPL → RSS: Continued

Excellent

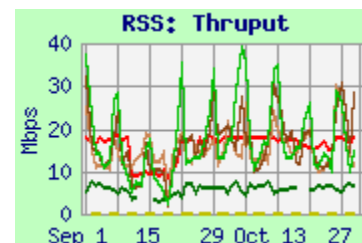
RSS → GHRC: Continued

Excellent

Web Page <http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml>

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
JPL PODAAC → RSS (Comcast)	39.6	17.6	7.3
JPL TES → RSS (Comcast)	50.4	14.2	5.6
GSFC-NISN → RSS (Comcast)	18.5	17.6	11.8
GHRC-UAH → RSS (Comcast)	49.3	16.4	3.3
GHRC-NISN → RSS (Comcast)	10.4	6.2	2.8
RSS (Comcast) → GHRC (UAH)	4.73	2.95	0.89
RSS (Comcast) → GHRC (NISN)	3.82	3.03	1.32



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL PODAAC → RSS	CY '12 -	0.16	0.49	Excellent
RSS → GHRC	CY '12 -	0.32	0.34	Excellent

Comments: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving L1 data from JAXA via JPL, and sending its processed L2 results to GHRC (aka NSSTC) (UAH, Huntsville, AL). Note that AMSR-E is not operating at this time, so that data is not flowing. However, AMSR2 is operating on JAXA's GCOM-W1 spacecraft, and sending data to RSS (but this is not an EOS requirement).

At the end of March '12, RSS switched its production node from the NISN SIP circuit (4 x T1s to NASA ARC -- total 6 mbps) to the Comcast circuit, rated at 50 mbps incoming, and 12 mbps outgoing (installed in April 2011). Testing via the NISN circuit to RSS was discontinued at that time.

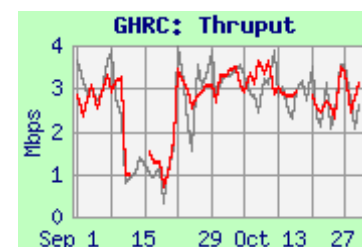
JPL → RSS: The median iperf from JPL PODAAC remained well above 3 x the reduced requirement, so the rating from JPL remains Excellent.

GHRC → RSS: Testing from the UAH server at GHRC was noisy but stable, with significant diurnal variation. Testing from the NISN server at GHRC was a bit less noisy, but lower than from UAH.

GSFC → RSS: Testing from GSFC-NISN was quite steady this month. Previously, it had degraded around the beginning of June, indicating a peering problem between NISN and Comcast, but recovered at the end of June.

RSS → GHRC: The server at RSS on the Comcast circuit allows "3rd party" testing, as do the servers at GHRC. Testing is therefore performed between RSS and GHRC, both with a UAH address and a NISN address at GHRC.

The results to the two destinations are very similar. The performance from both sources remained well above 3 x the requirement, so the rating remains Excellent.



7) Wisconsin:Rating: Continued **Excellent**Web Pages <http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E	2789.1	2442.8	1969.7	413.8	2533.8
GES DISC	936.1	930.7	860.2		
GSFC ENPL	3194.9	3043.3	2182.9		
LaRC ANGe	554.2	342.1	48.4		

Requirements:

Source Node	Date	mbps	Prev	Rating
NPP-SD3E	CY'12 -	237.2	237.2	Excellent
GSFC MODAPS	CY'12 -	21.9	16.5	Excellent
GSFC Combined	CY'12 -	259.1	253.7	Excellent
LaRC Combined	CY'12 -	n/a	7.9	n/a

Comments: The University of Wisconsin is included in this Production report due to its function as Atmosphere PEATE for NPP. Wisconsin continues to be an SCF on the MODIS, CERES and AIRS teams.

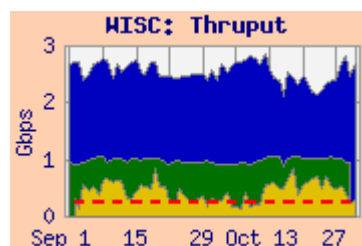
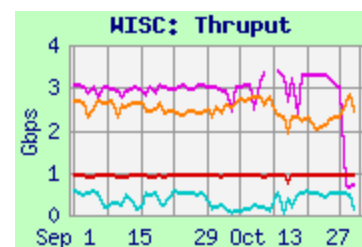
GSFC: At the end of March 2013, testing from **GSFC-ENPL** was switched to a new 10 gig server at Wisconsin (SSEC), with throughput usually over 3 gbps.

User flow was high, well above the requirement and last month's 307 mbps.

Testing from **NPP-SD3E** was also switched to Wisconsin's 10 gig server, in May, with throughput typically around 2.5 gbps! The integrated throughput from **NPP-SD3E** was above the NPP requirement by more than 3 x, so the NPP rating remains **Excellent**. It was also above the GSFC combined requirement by more than 3 x, so that rating also remains **Excellent**.

The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

LaRC: There is no longer a CERES requirement from LaRC to Wisconsin. On 23 April, testing from **LaRC ANGe** was switched to the new SSEC 10 gig server; performance improved at that time. Throughput from **LaRC ANGe** is very noisy (with a 11.5:1 average best:worst ratio), but is well above the previous 7.9 mbps requirement; it would be rated **Excellent**. The route from LaRC is via NISN, peering with MREN in Chicago.



8) KNMI:Rating: Continued **Excellent**Web Pages http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
OMISIPS → KNMI-ODPS	456.7	286.1	146.2	2.15	286.1
GSFC-ENPL → KNMI-ODPS	679.0	575.5	412.4		

Requirements:

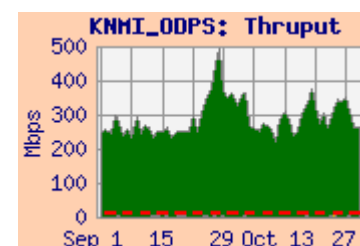
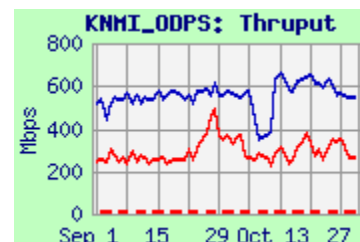
Source Node	Date	mbps	Prev	Rating
OMISIPS	CY'12 -	13.4	0.03	Excellent

Comments: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 2+ x 10 gbps circuit to Frankfurt, then via Surfnets through Amsterdam.

The requirement was increased with the use of the database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

The rating is based on the results from **OMISIPS** on EBnet at GSFC to the ODPS primary server at KNMI. Thruput from **OMISIPS** has been noisy but mostly stable, with a 3.1:1 best : worst ratio. The median thruput remains much more than 3 x the increased requirement, so the rating remains **Excellent**.

The user flow, however, averaged only 2.15 mbps this month, similar to recent months, but only 16% of the revised requirement.



9) JSpace - ERSD:

Ratings: **GSFC → ERSD: Continued Excellent**
ERSD → EROS: Continued Excellent
ERSD → JPL-ASTER-IST: N/A

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml>

US ↔ JSpace - ERSD Test Results

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → JSpace-ERSD	213.7	111.8	47.4	3.2	111.8
GES DISC → JSpace-ERSD	62.4	60.0	37.6		
GSFC ENPL (FE) → JSpace-ERSD	95.6	95.1	94.3		
GSFC ENPL (GE) → JSpace-ERSD	453.5	266.7	79.5		
JSpace-ERSD → EROS	191.5	178.0	104.4	3.4	178.0
JSpace-ERSD → JPL-TES	94.8	61.3	35.5		

Requirements:

Source → Dest	CY	Mbps	Prev	Rating
GSFC → JSpace-ERSD	'12 -	6.75	5.4	Excellent
JSpace-ERSD → JPL-ASTER IST	'12 -	0.31	0.31	Excellent
JSpace-ERSD → EROS	'12 -	8.33	8.3	Excellent

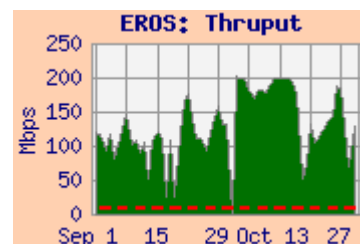
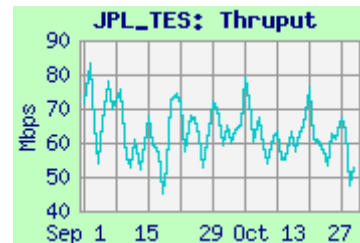
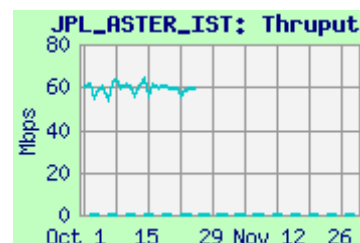
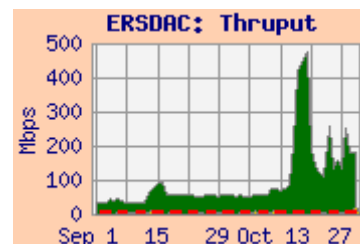
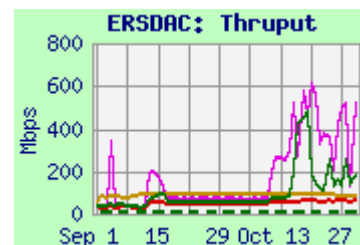
Comments: **GSFC → JSpace-ERSD:** The median throughput to JSpace-ERSD from most sources improved in September 2011, when the connection from JSpace-ERSD to Tokyo-XP was upgraded to 1 gbps (from 100 mbps). Peak throughput from **GSFC ENPL** is now often over 400 mbps.

Some nodes, however, (e.g., **EDOS**) had been using QoS (HTB) to reduce loss previously seen in the 1 gig to 100 meg switch at Tokyo-XP – so it initially remained limited by its HTB settings, and did not see much improvement. The **EDOS** HTB settings were raised in February 2013, resulting in much higher average performance, although it was also very noisy.

Throughput to ERSD dropped from all sources dropped and became very noisy in mid August. The POC reports that this was caused by very high levels of ingest (not from GSFC). Throughput recovered in early October. Median throughput remained well above 3 x the reduced requirement, so the rating remains **Excellent**. The user flow was close to normal from GSFC to JSpace-ERSD this month, consistent with the requirement.

JSpace-ERSD → JPL-ASTER-IST: The JPL-ASTER-IST test node was retired in October 2012. JPL no longer uses a distinct IST; instead, JPL personnel log in directly to the IST at JSpace-ERSD. As a substitute, testing was initiated from ERSD to a different node at JPL ("TES"). Results to TES would be rated **Excellent**.

JSpace-ERSD → EROS: The throughput improved with retuning in October '11, after the ERSDAC Gig-E upgrade. Performance dropped in August, apparently due to the congestion above, and recovered this month. Throughput remains well above the reduced requirement (was 26.8 mbps previously), so the rating remains **Excellent**. The user flow this month was consistent with the requirement.



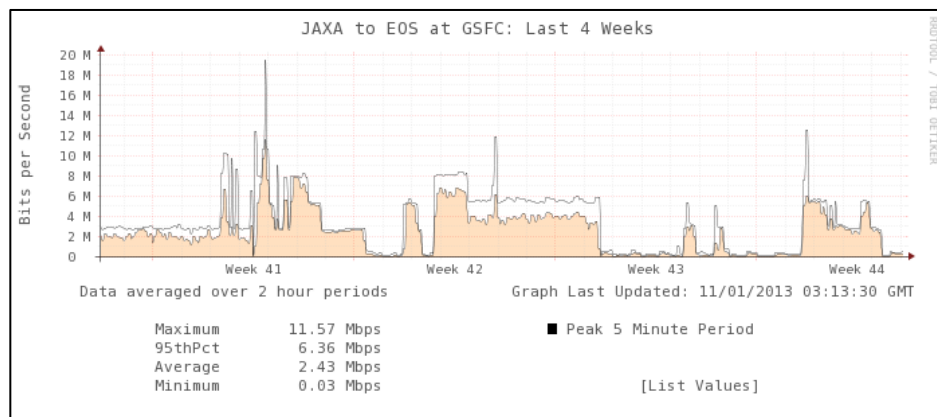
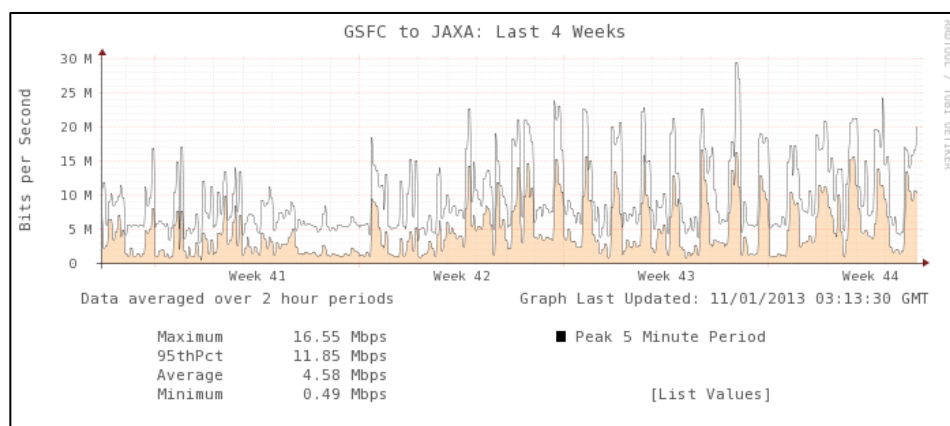
10) US \leftrightarrow JAXA

Ratings: US \rightarrow JAXA: N/A
JAXA \rightarrow US: N/A

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009. No additional testing is planned for AMSR or TRMM. All testing to JAXA-TKSC for ALOS was terminated at the end of June '09. JAXA has been requested to restore these tests – in preparation for GPM -- but has declined to participate.

However, the user flow between GSFC-EBnet and JAXA continues to be measured. As shown below, the user flow this month averaged 4.6 mbps from GSFC-EBnet to JAXA, and 2.4 mbps from JAXA to GSFC-EBnet.

These values are above but mostly consistent with the new (database) requirements of 3.36 mbps to JAXA, and 1.31 mbps back to JPL. However, since no iperf tests are run, the true capability of the network cannot be determined, and therefore no rating is assigned.



Note that throughput from GSFC to the Tokyo Exchange Point is well in excess of the JAXA requirements.

